

42

1. Apparatus for testing a stone mounted in an electrically conductive mounting for genuineness as a diamond with a single probe applied to the stone surface, the apparatus comprising:
  - a) a thermally and electrically conductive probe tip mounted in a housing;
  - b) a thermal conductivity measuring assembly mounted in the housing and connected to the probe tip;
  - c) an electrical conductivity measuring assembly mounted in the housing and connected to the probe tip;
  - d) thermal conductivity display means mounted in the housing and connected to the thermal conductivity measuring assembly for displaying an indication of the thermal conductivity of the stone relative to the thermal conductivity of diamond; and
  - e) electrical conductivity display means mounted in the housing and connected to the electrical conductivity measuring assembly for displaying an indication of the electrical conductivity of the stone relative to the electrical conductivity of diamond.
2. The apparatus of claim 1 further comprising:
  - a) an external electrical contact on the housing surface connected to the electrical conductivity measuring assembly for completing an electrical circuit through the user when the user holds an electrically conductive item on which the stone is mounted and also holds the housing, while contacting the external electrical contact;
  - b) the electrical conductivity measuring assembly applying a high direct current voltage to the stone and measuring the direct current flowing through the stone; and
  - c) circuitry means in the housing connected to the two assemblies for sequentially actuating first one of the assemblies and then the other of the assemblies.
3. The apparatus according to claim 2, in which the thermal and electrical conductivity display means include visible and audible displays.
4. The apparatus according to claim 3, in which the thermal conductivity measuring assembly is actuated first, and then the electrical conductivity measuring assembly is actuated to thereby indicate first if the stone has the thermal conductivity consistent with diamond, and then if the stone has the electrical conductivity consistent with diamond.

5. The apparatus according to claim 2 in which a positive direct current voltage of at least nine hundred and fifty volts is applied to the external electrical contact during the electrical conductivity measurement through a resistor string, and the current is measured by the voltage across a portion of the string.
6. The apparatus according to claim 2, in which a thermally conductive and electrically insulating spacer is interposed between the thermal conductivity measuring assembly and the probe tip.
7. Apparatus for testing a stone for genuineness as a diamond with a single probe applied to the stone surface, the apparatus comprising:
  - a) a thermally and electrically conductive probe tip mounted in a housing;
  - b) a thermal conductivity measuring assembly mounted in the housing and connected to the probe tip;
  - c) an electrical conductivity measuring assembly mounted in the housing and connected to the probe tip for applying a high direct current voltage through the stone and measuring the direct current flowing therethrough;
  - d) thermal conductivity display means mounted in the housing and connected to the thermal conductivity measuring assembly for displaying an indication of the thermal conductivity of the stone relative to the thermal conductivity of diamond;
  - e) electrical conductivity display means mounted in the housing and connected to the electrical conductivity measuring assembly for displaying an indication of the electrical conductivity of the stone relative to the electrical conductivity of diamond;
  - f) an external electrical contact on the housing surface connected to the electrical conductivity measuring assembly for completing an electrical circuit through the user when the user holds an electrically conductive item on which the stone is mounted and also holds the housing, while contacting the electrical contact;
  - g) circuitry means in the housing connected to the two assemblies for sequentially actuating first one of the assemblies and then the other of the assemblies;
  - h) the thermal and electrical conductivity display means including visible and audible displays; and
  - i) in which the thermal conductivity measuring assembly is actuated first, and then the

electrical conductivity measuring assembly is actuated to thereby indicate first if the stone has the thermal conductivity consistent with diamond and then if the stone has the electrical conductivity consistent with diamond.

8. A method of distinguishing between a true diamond and another stone when the stone is mounted on an electrically conductive mounting using two hands of a user the method comprising:
- a) providing a housing with a thermally and electrically conductive probe tip having both thermal and electrical conductivity measuring assemblies connected thereto, an external electrical contact connected to the electrical conductivity measuring assembly, and display means for indicating when the stone has the thermal and electrical conductivity consistent with diamond;
  - b) holding the stone mounting in one hand;
  - c) holding the housing in the other hand while contacting the external contact;
  - d) applying the probe tip to the surface of the stone;
  - e) causing the thermal conductivity measuring assembly to be actuated to thereby indicate by the display means what the thermal conductivity of the stone is relative to diamond; and
  - f) causing the electrical conductivity measuring assembly to be actuated to indicate by the display means what the electrical conductivity is relative to diamond.